system conditions by misadjustment, artificial signals, improper wiring, tampering, or revision of the system tested. The use of a synthesized signal or condition applied to a sensor is acceptable if the required test equipment is maintained in good working order and is periodically calibrated. Proper operation and proper calibration of test equipment must be demonstrated to the Officer in Charge, Marine Inspection.

§ 61.35–3 Required tests and checks.

(a) Tests and checks must include the following:

(1) *Safety (Programming) controls.* Safety controls must control and cycle the unit in the proper manner and sequence. Proper prepurge, ignition, postpurge, and modulation must be verified. All time intervals must be verified.

(2) *Flame safeguard.* The flame safeguard system must be tested by causing flame and ignition failures. Operation of the audible alarm and visible indicator must be verified. The shutdown times must be verified.

(3) *Fuel supply controls.* Satisfactory shutdown operation of the two fuel control solenoid valves must be verified. No visible leakage from the valves into the burner(s) must be verified.

(4) *Fuel oil pressure limit control.* A safety shutdown must be initiated by lowering the fuel oil pressure below the value required for safe combustion. System shutdown and the need for manual reset prior to automatic startup must be verified.

(5) *Fuel oil temperature limit control.* (Units designed to burn heavy fuel oil.) A safety shutdown must be initiated by lowering the fuel oil temperature below the designed temperature. System shutdown and the need for manual reset prior to automatic startup must be verified.

(6) *Combustion controls.* Smooth and stable operation of the combustion controls must be verified.

(7) *Draft limit control.* The draft loss interlock switch must be tested to ensure proper operation. The draft limit control must cause burner shutdown and prevent startup when an inadequate air volume is supplied to the burner(s).

(8) *Limit controls.* Shutdown caused by the limit controls must be verified.

(9) *Water level controls.* Water level controls must be tested by slowly lowering the water level in the boiler. Each operating water level control must be individually tested. The upper low water cutoff and the lower low water cutoff must each be tested. The audible alarm and visible indicator associated with the lower low water cutoff must be tested. The manual reset device must be tested after the lower low water cutoff has been activated.

(10) *Feed water flow controls.* The feed water flow limit device (found on steam boilers and water heaters without water level controls) must be tested by interrupting the feed water supply. Manual reset must be required prior to restarting the boiler.

(11) *Low voltage test.* The fuel supply to the burners must automatically shut off when the supply voltage is lowered.

(12) *Switches.* All switches must be tested to verify satisfactory operation.

Subpart 61.40—Design Verification and Periodic Testing of Vital System Automation

SOURCE: CGD 81–030, 53 FR 17837, May 18, 1988, unless otherwise noted.

§ 61.40–1 General.

(a) All automatically or remotely controlled or monitored vital systems addressed by part 62 of this subchapter must be subjected to tests and inspections to evaluate the operation and reliability of controls, alarms, safety features, and interlocks. Test procedures must be submitted to the Coast Guard for approval.

(b) Persons designated by the owner of the vessel shall conduct all tests and the Design Verification and Periodic Safety tests shall be witnessed by the Coast Guard.

(c) Design Verification and Periodic Safety test procedure documents approved by the Coast Guard must be retained aboard the vessel.